Air Quality Permitting
Statement of Basis

September 10, 2004

Permit to Construct No. P-040106

Merritt Brothers Lumber Co., Athol

Facility ID No. 055-00039

Prepared by:

Shawnee Chen, P.E. Senior Engineer
AIR QUALITY DIVISION

FINAL PERMIT

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Acronyms, Units, and Chemical Nomenclatures

ACFM	Actual Cubit Feet per Minute
AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
AQCR	Air Quality Control Region
bdft	board feet
Btu/hr	British thermal unit per hour
CFR	Code of Federal Regulations
CO	carbon monoxide
DEQ	Department of Environmental Quality
HAPs	hazardous air pollutants
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
lb/day	pounds per day
lb/hr	pounds per hour
lb/T	pounds per ton
mbdft	1,000 board feet
mmbdft/yr	million board feet per year
MBL	Merritt Brothers Lumber Co.
MACT	Maximum Achievable Control Technology
NAAQS	National ambient air quality standard
NESHAP	Nation Emission Standards for Hazardous Air Pollutants
NO_X	nitrogen oxides
NSPS	New Source Performance Standards
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTE	potential to emit
Rules	*Rules for the Control of Air Pollution in Idaho*
SIP	State Implementation Plan
SO_2	sulfur dioxide
TAPs	Toxic Air Pollutants
T/yr	tons per year
$\mu g/m^3$	micrograms per cubic meter
VOC	volatile organic compound

1. PURPOSE

The purpose for this memorandum is to satisfy the requirements of IDAPA 58.01.01.200-228 and 400-470, *Rules for the Control of Air Pollution in Idaho,* for issuing permits to construct and Tier II operating permits, respectively.

2. FACILITY DESCRIPTION

Merritt Brothers Lumber Co. (MBL) owns and operates a planer mill, remanufacturing plant, and finger-jointing facility.

Random dimension lumber is delivered to the facility for remanufacturing in the remanufacturing plant. The remanufacturing process produces wood chips, which are blown through a cyclone to the target box on top of the chip bin. Chips are loaded into trucks from the bottom of the chip bin for transport offsite.

Lumber is cut to width and smoothed in the planer mill. Planing produces shavings and a small amount of dry chips. The planer shavings, chips, and hogged wood, are transported via cyclones to the shavings truck bin. Shavings are loaded into trucks from the bottom of the shavings bin for transport offsite.

Cut ends are delivered to the facility from various off-site sources for finger-jointing. Random board pieces are cut and joined to produce a saleable product. Chips and sawdust for the finger-jointing process are transported pneumatically to two cyclones on separate truck bins. The material is loaded into trucks from the bottom of the bins for transport offsite.

Green lumber is dried in the dry kilns. The dry kilns are heated using non-contact steam coils.

Natural gas fired boilers generate steam for dry kilns.

3. FACILITY / AREA CLASSIFICATION

The facility is not a major facility as defined in IDAPA 58.01.01.205 or 008.10. It is not a designated facility as defined in IDAPA 58.01.01.006.27. The facility is not subject to New Source Performance Standards, in accordance with 40 CFR, Part 60; National Emission Standards for Hazardous Air Pollutants, in accordance with 40 CFR, Part 61; or National Emission Standards for Hazardous Air Pollutants for Source Categories (MACT), in accordance with 40 CFR, Part 63. The Standard Industrial Classification defining the facility is 2421. The facility is classified as a natural minor (B) source because actual and potential emissions of regulated air pollutants are less than 100 T/yr.

Merritt Brothers Lumber Co. is located in Athol, Kootenai County, which is in AQCR 62 and Zone 11. Kootenai County is classified as attainment or unclassifiable for all state and federal criteria air pollutants.

The AIRS information that provided in Appendix B defines the classification for each regulated air pollutant at MBL. This required information is entered into the EPA AIRS database.

4. APPLICATION SCOPE

Merritt Brothers Lumber Co. is proposing to modify its Tier II OP/PTC issued on February 6, 2004. MBL proposes to add a fourth kiln to raise the total drying capacity by 40 million board feet per year (mmbdft/yr), from 90 mmbdft/yr to 130 mmbdft/yr. MBL also proposes to add a second natural gas-fired boiler. The No. 2 boiler is a Cleaver Brooks, model CB 200-350 natural gas-fired boiler with a rated heat input of 14.65 million Btu/hr.

4.1 Application Chronology

May 3, 2004	DEQ received a 15-day pre-permit construction approval application from MBL for the addition of a fourth kiln and a second natural gas-fired boiler. This application supersedes the April 14, 2004, PTC application. The application fees for April 14, 2004, application applies to this 15-day pre-permit construction application.
May 20, 2004	DEQ issued a letter for approving the application and declaring the application complete.
May 25, 2004	DEQ received information on the No.2 natural gas-fired boiler.
June 22, 2004	A 30-day opportunity for public comment began. The opportunity for public comment ended on July 22, 2004. No comments were received.
July 1, 2004	DEQ received a revised modeling file through email and revised emissions inventory by fax.
July 7, 2004	Lorenzen Engineering, MBL's consultant, provided the maximum drying kiln capacity by telephone.

5. PERMIT ANALYSIS

5.1 Equipment Listing

- Boiler No.1: Cleaver Brooks natural gas-fired boiler, Model L-59569, 29.3 million Btu/hr, constructed in November 1974 and installed at the facility in February 2001.
- Boiler No.2: Cleaver Brooks natural gas-fired boiler, Model CB200-350, 14.65 million Btu/hr, constructed in June 24, 1973, and is allowed to install at the facility after May 20, 2004, when the 15-day pre-construction was approved.
- Lumber drying kilns (4), rated at 130 mmbf/yr, two were installed in February 2001, one was installed in March 2002, and the fourth one would be installed after May 20, 2004, the 15-day pre-construction was approved.
- Cyclone No. 1 – Old planer cyclone with flowrate of 20,500 actual cubic feet per minute (acfm).
- Cyclone No. 2 – Rip saw relay cyclone with flowrate of 18,250 acfm.
- Cyclone No. 3 – Rip saw cyclone with flowrate of 20,500 acfm.
- Cyclone and Baghouse No. 4 – New planer cyclone and baghouse with flowrate of 45,000 acfm.
- Cyclone No. 5 – Finger-jointer cyclone with flowrate of 20,500 acfm.
- Cyclone No. 6 – Finger-jointer cyclone (pull through) with flowrate of 20,500 acfm.
- Cyclone No. 7 – Remanufacturing chips cyclone with flowrate of 18,250 acfm.
- Chip bin target box with throughput of 1.31 bone-dry ton per hour.
- Planer Process including planer hog (indoor) with 0.53 bone-dry ton planer chips per hour, and planer screen (classifier, indoor) with 0.53 bone-dry ton planer chips per hour.
- Chip bin truck loadout with 1.31 bone-dry ton remanufacturing chips per hour.
- Shavings bin truck loadout with 4.33 bone-dry ton planer shavings per hour.

5.2 *Emission Estimates*

Emissions estimates were provided by MBL's consultant (Lorenzen Engineering, Inc.) and were included in the pre-permit construction application materials that were received by DEQ on May 6, 2004. The emissions calculations submitted in the application were checked by DEQ for the bases of the emissions factors and references and found to be consistent with current DEQ methodology. Therefore, DEQ used the applicant emissions estimates as the basis for the permitting analyses of this project.

Section 4 of MBL's permit application contains detailed emissions estimates for point and fugitive sources at the facility. All methodologies and assumptions used in the emissions estimates are presented and documented in this section of the application. Section 4 is included in Appendix C of this basis of statement.

Table 5.2.1 provides a summary of the criteria air pollutants of the facility based on potential to emit (PTE). Table 5.2.1 provides a summary of toxic air pollutants (TAPs) of the facility based on PTE.

Table 5.2.1 SUMMARY OF EMISSIONS INVENTORY

Merritt Brothers Lumber Co. Inc., Athol Potential Emissions[a] – Hourly (lb/hr), and Annual (T/yr)										
Point Source Description	**PM_{10}**		**NO_x**		**CO**		**VOC**		**SO_2**	
	lb/hr[b]	**T/yr**	**lb/hr**	**T/yr**	**lb/hr**	**T/yr**	**Lb/hr**	**T/yr**	**lb/hr**	**T/yr**
Lumber Drying										
Drying Kilns	1.63/3.26 [c]	7.15	NA	NA	NA	NA	22.26	97.50	NA	NA
Planer Point Sources										
Old Planer Cyclone, No.1	2.26/1.89	8.26	NA	NA	NA	NA	NA	NA	NA	NA
Trim Saw and Hammer Hog Cyclone, No.2	0.13/0.11	0.48	NA	NA	NA	NA	NA	NA	NA	NA
In-Line Cyclone (pull-through), No.7	0.13/0.11	0.48	NA	NA	NA	NA	NA	NA	NA	NA
Rip Saw Cyclone, No.3	0.13/0.11	0.48	NA	NA	NA	NA	NA	NA	NA	NA
New Planer Cyclone, No.4	1.66/1.38	6.05	NA	NA	NA	NA	NA	NA	NA	NA
Chip Bin Target Box	0.33/0.27	1.20	NA	NA	NA	NA	NA	NA	NA	NA
Finger-Jointer Point Sources										
Finger Jointer Cyclone, No.5	0.15/0.125	0.55	NA	NA	NA	NA	NA	NA	NA	NA
Finger Jointer Cyclone (pull-through), No.6	0.15/0.125	0.55	NA	NA	NA	NA	NA	NA	NA	NA
Natural Gas Fired Boiler										
Boiler No.1	0.22	0.98	2.93	12.83	2.46	10.78	0.16	0.71	0.02	0.08
Boiler No.2	0.11	0.49	1.47	6.42	1.23	5.39	0.08	0.35	0.01	0.04
Point Source Total		26.67		19.25		16.17		98.56	0.03	0.12
Planer, Fugitives										
Planer Hog	0.00	0.01	NA	NA	NA	NA	NA	NA	NA	NA
Planer Chipper Screen	0.00	0.01	NA	NA	NA	NA	NA	NA	NA	NA
Old Planer Chip Bin Truck Loadout	0.03	0.12	NA	NA	NA	NA	NA	NA	NA	NA
Planer Shavings Bin Truck Loadout	0.11	0.40	NA	NA	NA	NA	NA	NA	NA	NA
Fugitive Total		0.54	NA	NA	NA	NA	NA	NA	NA	NA
Total Emissions From Facility		27.21		19.25		16.17		98.56		0.12

[a] As determined by a pollutant-specific EPA reference method, DEQ-approved alternative, or as determined by DEQ's emissions estimation methods used in this permit analysis.

[b] The calculated pound per hour emissions rates are listed before the back slash. The pound per hour emissions rates used for modeling are listed after the back slash. Because cyclones, baghouse, and the target box are permitted to operate 20 hours per day, the pound per hour emissions rates for modeling are calculated by multiplying pound per hour emissions rates to 20 hours and being divided by 24 hours.

c The pound per hour emissions rate before the back slash is calculated: 130 mmbdft/yr x 1,000 mbdft/mmbdft x 0.11 lb/1,000 mbdft / 8760 hr/yr = 1.63 lb/hr. This is modeled to demonstrate compliance with PM_{10} annual average NAAQS. The pound per hour emissions rate after the back slash is calculated: 21.67 mmbdft/mon x 1,000 mbdft/mmbdft x 0.11 lb/1,000 mbdft / 30.5 day/mon. / 24 hr/day = 3.26 lb/hr. This is modeled to demonstrate compliance with PM_{10} 24-hour average NAAQS.

Table 5.2.2 FACILITY TAPS (IDAPA 58.01.01.585 AND 586) EMISSION INVENTORY BASED ON PTE[A,B]

Pollutants	Natural Gas-Fired Boiler No.1		Natural Gas-Fired Boiler No.2		Drying Kilns	
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Benzene	6.03 E-05	2.64E-04	3.02 E-05	1.32E-04		
Benzo(a)pyrene	3.45 E-08	1.51E-07	1.72 E-08	7.55E-08		
Formaldehyde	2.15 E-03	9.44E-03	1.08 E-03	4.72E-03	6.00 E-02	2.60 E-01
Hexane	5.17 E-02	2.26E-01	2.59 E-02	1.13E-01		
Naphthalene	1.75 E-05	7.67E-05	8.76 E-06	3.84E-05		
Pentane	7.47 E-02	3.27E-01	3.73 E-02	1.64E-01		
Toluene	9.77 E-05	4.28E-04	4.88 E-05	2.14E-04		
Arsenic	5.75 E-06	2.52E-05	2.87 E-06	1.26E-05		
Barium	1.26 E-04	5.54E-04	6.32 E-05	2.77E-04		
Beryllium	3.45 E-07	1.51E-06	1.72 E-07	7.55E-07		
Cadmium	3.16 E-05	1.38E-04	1.58 E-05	6.92E-05		
Chromium	4.02 E-05	1.76E-04	2.01 E-05	8.81E-05		
Cobalt	2.41 E-06	1.06E-05	1.21 E-06	5.28E-06		
Copper	2.44 E-05	1.07E-04	1.22 E-05	5.35E-05		
Manganese	1.09 E-05	4.78E-05	5.46 E-06	2.39E-05		
Mercury	7.47 E-06	3.27E-05	3.73 E-06	1.64E-05		
Molybdenum	3.16 E-05	1.38E-04	1.58 E-05	6.92E-05		
Nickel	6.03 E-05	2.64E-04	3.02 E-05	1.32E-04		
Selenium	6.89 E-07	3.02E-06	3.45 E-07	1.51E-06		
Vanadium[4]	1.18E-04	5.17E-04	5.90E-05	2.58E-04		
Zinc	8.33 E-04	3.65E-03	4.17 E-04	1.82E-03		
Methanol					8.90 E-01	3.90 E+00
Phenol					6.00 E-02	2.60 E-01

[A]As determined by a pollutant-specific EPA reference method, a DEQ-approved alternative, or as determined by DEQ's emissions estimation methods used in this permit analysis.

[B]Compliance with annual limits determined by multiplying the actual or allowable (if actual is not available) pound per hour emission rate by the allowable hours per year that the process(es) may operate(s), or by actual annual production rates.

5.3 Modeling

The facility has demonstrated compliance, to DEQ's satisfaction, that this project will not cause or significantly contribute to a violation of any ambient air quality standards. The summary of the modeling analysis is in Table 5.3.1 and Table 5.3.2. Detailed modeling analysis is included in Appendix A.

Table 5.3.1 FULL IMPACT ANALYSIS RESULTS

Pollutant	Averaging Period	Facility Ambient Impact ($\mu g/m^3$)	Background concentration ($\mu g/m^3$)	Total Ambient Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Percent of NAAQS
PM_{10}	24-hour	69.9	66	135.9	150	91
	Annual	14	21	35	50	70
CO	1-hour	1,840	13,800	15,640	40,000	39
	8-hour	388	4,600	4,988	10,000	50
SO_2	3-hour	5.76	42	47.76	1,300	4
	24-hour	1.51	26	27.51	365	8
	Annual	0.25	8	8.25	80	11
NO_2	Annual	36	17	53	100	53
Pb	Quarterly	2.7E-04	0.03	0.03	1.5	2

Table 5.3.2 TOXIC AIR POLLUTANTS

Pollutant	Average period	Concentration ($\mu g/m^3$)	Regulatory Limit ($\mu g/m^3$)	Percent of Limit
Arsenic	Annual	7.00E-05	2.3E-04	30
Cadmium	Annual	4.00E-04	5.6E-04	71
Chromium, Total	Annual	2.00E-05	8.3E-05	60
Nickel	Annual	7.6E-04	4.2E-03	18

6. PERMIT REQUIREMENTS

This section only addresses new or modified permit conditions due to this permit action.

A TAP analysis was conducted in accordance with IDAPA 58.01.01.210. Emissions of four TAP metals exceeded their respective screening emissions level (EL). Modeling of these four TAPs was conducted. The ambient concentration of these TAPs is less than each TAP's acceptable ambient concentration. Therefore, this modification complies with preconstruction toxic rules. Details can also be found in the modeling memo attached as Appendix A of this Statement of Basis.

Facility –Wide Condition

Permit Condition 2.2 was carried over from Tier II OP/PTC issued November 26, 2002. DEQ received fugitive dust management plan from the permittee on January 15, 2003. The permit condition was fulfilled. The permit condition is kept in the permit to keep this piece of information for the fugitive control purpose.

Natural Gas-Fired Boilers- No.1 and No.2

Including the addition of the No.2 boiler, the two cleaver Brooks natural gas-fired boilers generate steam for the lumber drying kilns.

6.1 Emissions Limits

Daily emissions limit for PM_{10} is established for each boiler because facility-wide modeled concentration plus background concentration is 91% of national ambient air quality standard (NAAQS) for 24-hr average. Annual emissions limit for VOC is added because the facility-wide VOC PTE is 98.56 T/yr, which is approaching the major source threshold of 100 T/yr. Emissions limits for NO_X and CO of Boiler No.2, and SO_2 of Boiler No.1 and Boiler No.2, are not established in the permit because they are inherently limited by the PM_{10} emissions limits. In addition, there are no significant concerns on their respective ambient impacts.

Emissions limits for CO and NO_X for Boiler No.1 were not changed as they are existing permit conditions and not affected by this permit action.

6.2 Compliance Demonstration

The facility will comply with the limits as long as it uses natural gas as the only fuel for these two boilers. These boilers are natural gas-fired boilers.

"Boiler No.1 and No.2 were constructed in November 1974 and June 1973, respectively. They were installed at the facility in February 2001 and 2004. No modifications have been made to the boilers since they were constructed in 1970s. Per EPA's interpretation, these boilers are not subject to 40 CFR 60 Subpart Dc."

Drying Kilns

With the addition of the kiln, the facility has four kilns with the total capacity of 130 mmbdft/yr. All four kilns are one structure.

6.3 Emissions Limits

The facility-wide modeled concentration plus background concentration for PM_{10} is 91% of NAAQS for 24-hr average. Therefore a daily PM_{10} emissions limit is established which is based on modeled emissions rate of 3.26 lb/hr for 24-hour average. The daily PM_{10} emissions limit is calculated as 3.26 lb/hr x 24 hr/day = 78.24 lb/day. Annual emissions limit for VOC is also established because the drying kiln's PTE is 97.50 T/yr, which is approaching the major source threshold of 100 T/yr.

The annual PM and PM_{10} emissions limits are revised to reflect the new production throughput and a new emissions factor. As stated in the application: *"PM and PM_{10} emissions from the dry kilns have been estimated using emissions factors published by the Olympic Region Clean Air Agency (ORCAA), formally the Olympic Air Pollution Control Authority (OAPCA). These factors were chosen over the Idaho DEQ PM and PM_{10} emissions factors because they are better supported with test data and analysis."* The emissions factor for PM and PM_{10} is 0.11 lb/mbdft. The kilns are in compliance with the process weight rate rule. The calculation can been found in the application.

6.4 Compliance Demonstration

Lumber drying is a batch process. Lorenzen Engineering, MBL's consultant, provided the maximum drying kilns (4) capacity through the phone on July 7, 2004. It is 660 mbdft, assuming all PM_{10} emissions from a single batch (four kilns) emit within a 24-hour period. The worst case hourly rate based on 24-hour average is calculated as 660 mbdft x 0.11 lb/mbdft / 24 hr = 3.03 lb/hr. The kilns are modeled at 3.26 lb/hr and the modeling results demonstrate compliance with the NAAQS. The kilns are in compliance with PM_{10} 24-hour NAAQS at their maximum design capacity. There is no need for specific daily operating requirements or monitoring requirements. In real life, the drying time for a single batch is longer than 24 hours. Therefore, the above assumption is very conservative.

The annual throughput limit is established to ensure that the emissions do not exceed the annual emissions limits. The permittee is required to monitor and record, on a monthly and annual basis, the lumber throughput to the drying kilns. The amounts shall be recorded as million board feet per year (mmbdft/yr) based on board scale, to demonstrate compliance with monthly and annual throughput limits. The annual amount shall be based on a rolling 12-month summation.

Cyclones, Planer Cyclone Baghouse and Target Box

No physical and operational changes were made to these emissions units.

6.5 Emissions Limits

Daily emissions limit for PM_{10} is established for each emissions point because facility-wide modeled concentration plus background concentration is 91% of NAAQS for 24-hr average. Existing emissions limits for PM and PM_{10} are unchanged as there is no physical or operational changes to the emissions units. The emissions units are in compliance with the process weight rate rule. The calculation can been found in the application.

6.6 Compliance Demonstration

As long as the facility operates these emissions units 20 hours or less per day, the facility will be in compliance with the limits. No change is made to the existing compliance methods. They are adequate to demonstrate compliance with the daily emissions limits for each emissions point.

7. FEES

MBL paid the $1,000 application fee as required in IDAPA 58.01.01.224 on April 14, 2004. A permit to construct processing fee of $5,000 was required in accordance with IDAPA 58.01.01.225 because the increase in emissions from the modification was greater than 10 T/yr and less than 100 T/yr. The applicant provided the emissions changes. The processing fee was received on September 10, 2004. The MBL facility is not a major facility as defined in IDAPA 58.01.01.008.10. Therefore, Title V registration fees are not applicable in accordance with IDAPA 58.01.01.387.

Table 7.1 EMISSIONS INVENTORY

Emissions Inventory			
Pollutant	**Annual Emissions Increase (T/yr)**	**Annual Emissions Reduction (T/yr)**	**Annual Emissions Change (T/yr)**
NO_X	6.42	0	6.42
SO_2	0.04	0	0.04
CO	5.39	0	5.39
PM_{10}	3.05	0	3.05
VOC	30.35	0	30.35
TAPS/HAPS	0.96	0	1.65
Total:	46.20	0	**46.9**
Fee Due	**$5,000.00**		

8. RECOMMENDATION

Based on review of application materials and all applicable state and federal rules and regulations, staff recommend that MBL be issued modified Tier II Operating Permit and PTC No. P-040106 for the addition of second natural gas-fired boiler and forth lumber drying kiln. No public comment period is recommended, no entity has requested a comment period, and the project does not involve PSD requirements.

BR/SYC/bf Permit No. P-040106

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APPENDIX A
Modeling Review

Permit to Construct No. P-040106

Merritt Brothers Lumber Co., Athol

Facility ID No. 055-00039

MEMORANDUM

DATE: August 2, 2004

TO: Shawnee Chen, Senior Engineer, Technical Services Division

FROM: Almer Casile, Air Quality Permitting Analyst, Air Quality Division AC

THROUGH: Mary Anderson, Modeling Coordinator, Air Quality Division MA

PROJECT NUMBER: P - 040100

SUBJECT: Modeling Review for the 15-day Preconstruction Approval/Permit to Construct Application from Merritt Brothers Lumber Company

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1.0 Summary

The Department of Environmental Quality (DEQ) received a 15-day preconstruction approval/permit to construct application (PTC) from Merritt Brothers Lumber Company (Merritt Brothers) for their planer mill and fingerjointing facility in Athol, ID. Atmospheric dispersion modeling of facility-wide emissions was submitted in support of the application to demonstrate that the stationary source would not cause or significantly contribute to a violation of any ambient air quality standard (IDAPA 58.01.01.203.02). This modeling analysis included 14 sources and addressed the following criteria pollutants: PM_{10}, SO_2, NO_2, and CO. This analysis also addressed 4 toxic air pollutants.

Table 1 presents the key assumptions used in the modeling analysis submitted by the applicant.

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSIS SUBMITTED BY THE APPLICANT	
Assumption	**Explanation**
Kiln emissions assume 1/6th of the annual production could take place in one month.	Production value assumption results in a monthly kiln production of 21.67 mmbf/month, and an increase in the modeled emission rate of the kilns from 1.63 lb/hr to 3.26 lb/hr, effecting the 24 PM_{10} modeled values.

2.0 Background Information

2.1 Applicable Air Quality Impact Limits

This facility is located in Kootenai County designated as an attainment or unclassifiable area for sulfur dioxide SO_{20}, NO_2, CO, Pb, O_3, and PM_{10}. The applicable regulatory limits for this application are presented in Table 2.

Table 2. APPLICABLE REGULATORY LIMITS				
Pollutant	**Averaging Period**	**Significant Contribution Levels ($\mu g/m^3$)[a, b]**	**Regulatory Limit ($\mu g/m^3$)[c]**	**Modeled Value Used[d]**
PM_{10}[e]	Annual	1	50[f]	Maximum 1st highest
	24-hour	5	150[g]	Highest 2nd highest
CO	8-hour	500	10,000[h]	Highest 2nd highest
	1-hour	2000	40,000[h]	Highest 2nd highest
SO_2	Annual	1	80[h]	Maximum 1st highest
	24-hour	5	365[g]	Highest 2nd highest
	3-hour	25	1,300[g]	Highest 2nd highest
NO_2	Annual	1	100[f]	Maximum 1st highest
Arsenic	Annual	N/A	2.3E-04	Maximum 1st highest
Cadmium	Annual	N/A	5.6E-04	Maximum 1st highest
Chromium	Annual	N/A	8.3E-05	Maximum 1st highest
Nickel	Annual	N/A	4.2E-03	Maximum 1st highest

a. IDAPA 58.01.01.006.93
b. Micrograms per cubic meter
c. IDAPA 58.01.01.577 for criteria pollutants, IDAPA 58.01.01.585 for non-carcinogenic toxic air pollutants IDAPA 58.01.01.586 for carcinogenic toxic air pollutants.
d. The maximum 1st highest modeled value is always used for significant impact analysis and for all toxic air pollutants. Concentration at any modeled receptor.
e. Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
f. Never expected to be exceeded in any calendar year.
g. Never expected to be exceeded more than once in any calendar year.
h. Not to be exceeded more than once per year.

2.2 Background Concentrations

The appropriate background concentrations for this modeling analysis are presented in Table 3.

Table 3. BACKGROUND CONCENTRATIONS.		
Pollutant	**Averaging Period**	**Background concentrations ($\mu g/m^3$)[a]**
PM10	24-hour	66
	Annual	21
CO	1-hour	13,800
	8-hour	4,600
SO_2	3-hour	42
	24-hour	26
	Annual	8
NO_2	Annual	17
Lead	Quarterly	0.03

a. Micrograms per cubic meter.

3.0 Assessment of Submitted, Certified Modeling Analysis

This section documents the assessment of the application materials as submitted and certified by the applicant.

3.1 Modeling Methodology

Lorenzen Engineering, Inc conducted the modeling analysis. Table 4 presents the modeling assumptions and parameters used by the applicant. Table 4 also includes DEQ's review and determination of those assumptions and parameters.

Table 4. MODELING PARAMETERS.		
Parameter	**What Facility Submitted**	**DEQ's Review/Determination**
Modeling protocol	A modeling protocol was submitted for prior approval	The protocol was followed
Model Selection	ISC-prime	This is appropriate and correct version was used.
Meteorological Data	DEQ data from Meyer Ranch April 1, 2000 through March 31, 2001	Appropriate
Model Options	Regulatory defaults used	Appropriate
Land Use	Rural land use	Appropriate
Ambient Air Quality Boundary	Fences on north, east, and west side of facility. Southern end of facility is wooded and remote.	Appropriate
Complex Terrain	Complex terrain is present and included in the model,	Appropriate
Building Downwash	Downwash was included	Appropriate
Receptor Network	10 meter at hotspot areas 25 meter along ambient air boundary 100 meter out to 2000 meters	This is sufficient to adequately address the maximum design concentration
Facility Layout	N/A	The facility layout used in the model was verified by using the scaled plot plan submitted by the applicant

3.2 Emission Rates

Emissions rates used in the dispersion modeling analyses submitted by the applicant were reviewed against those in the permit application. If modeled emissions rates were equal to or slightly greater than the facility's emissions calculated in the permit application or the permitted allowable rate, then it was determined to be appropriate.

Tables 5 and 6 provide criteria pollutant and TAPs emission rates used in the submitted modeling files, respectively.

Table 5. EMISSION RATES FOR CRITERIA POLLUTANTS					
Source	**Emission Rates (lb/hr)**				
	Lead	**PM_{10}**	**NO_x**	**SO_2**	**CO**
BOILER1	1.46E-05	0.22	2.87	0.02	2.46
BOILER2	7.18E-06	0.11	1.47	0.01	1.21
TARGBOX	N/A	0.27	N/A	N/A	N/A
CYC1	N/A	1.89	N/A	N/A	N/A
CYC2	N/A	0.11	N/A	N/A	N/A
CYC3	N/A	0.11	N/A	N/A	N/A
CYC4	N/A	1.38	N/A	N/A	N/A
CYC5	N/A	0.13	N/A	N/A	N/A
CYC6	N/A	0.13	N/A	N/A	N/A
CYC7	N/A	0.11	N/A	N/A	N/A
KILNEXH1	N/A	0.82	N/A	N/A	N/A
KILNEXH2	N/A	0.82	N/A	N/A	N/A
KILNEXH3	N/A	0.82	N/A	N/A	N/A
KILNEXH4	N/A	0.82	N/A	N/A	N/A

Table 6. EMISSION RATES FOR TAPS			
Pollutant	Boiler 1 (lb/hr)	Boiler 2 (lb/hr)	Kilns (lb/hr)
Arsenic	5.86E-06	2.86E-06	N/A
Cadmium	3.22E-05	1.58-05	N/A
Chromium	4.10E-06	1.98E-06	N/A
Nickel	6.15E-05	3.02E-05	N/A

3.3 Emission Release Parameters

The emission release parameters used in the modeling analysis submitted by the applicant are presented in Table 7.

Table 7. EMISSION RELEASE PARAMETERS					
Source	Stack Exhaust Type	Height (ft)	Modeled Diameter (m)	Modeled Exit Velocity (m/s)	Exhaust Temperature (°F)
BOILER1	Vertical	25	0.9144	0.001	500
BOILER2	Vertical	25	0.4572	0.001	500
TARGBOX	Rain-cap	50	0.9144	0.001[a]	68
CYC1	Horizontal	70	0.001	0.001	68
CYC2	Horizontal	50	0.001	0.001	68
CYC3	Horizontal	30	0.001	0.001	68
CYC4	Horizontal	20	0.001	0.001	68
CYC5	Horizontal	60	0.001	0.001	68
CYC6	Rain-cap	20	0.9144	0.001[a]	68
CYC7	Horizontal	20	0.001	0.001	68
KILNEXH1	Vertical	30	0.9144	7.19	155
KILNEXH2	Vertical	30	0.9144	7.19	155
KILNEXH3	Vertical	30	0.9144	7.19	155
KILNEXH4	Vent Covers	30	0.9144	7.19	155
a. Horizontal and capped sources modeled based on Idaho modeling guidance.					

3.4 Results

These results are based on the modeling files submitted by the applicant and reviewed by DEQ.

3.4.1 Full Impact Analysis Results

Table 8. FULL IMPACT ANALYSIS RESULTS						
Pollutant	Averaging Period	Facility Ambient Impact ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Total Ambient concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Percent of NAAQS
PM_{10}	24-hour	69.9	66	135.9	150	91
	Annual	14	21[a]	35	50	70
CO	1-hour	1840	13,800	15,640	40,000	39
	8-hour	388	4,600	4,988	10,000	50
SO_2	3-hour	5.76	42	47.76	1,300	4
	24-hour	1.51	26	27.51	365	8
	Annual	0.25	8	8.25	80	11
NO_2	Annual	36	17	53	100	53
Pb	Quarterly	2.7E-04	0.03	0.03	1.5	2

a The applicant presented a value of 19 ug/m^3 for the PM10 24-hour background concentration. The correct value is 21 ug/m^3, and is used in this table.
b The ambient ratio method (ARM) factor of 0.75 has been used to convert NOx results to NO2 per 40 CFR 51 Appendix W Guideline on Air Quality Models.
c Quarterly compliance based on monthly value

3.4.2 Toxic Air Pollutants Results

Pollutant	Averaging Period	Concentration (ug/m^3)	Regulatory Limit (ug/m^3)	Percent of Limit
Arsenic	Annual	7.00E-05	2.3E-04	30
Cadmium	Annual	4.00E-04	5.6E-04	71
Chromium, total	Annual	2.00E-05	8.3E-05	60
Nickel	Annual	7.6E-04	4.2E-03	18

Appendix B
AIRS Information

Permit to Construct No. P-040106

Merritt Brothers Lumber Co., Athol

Facility ID No. 055-00039

Table A.1 AIRS/AFS[a] FACILITY-WIDE CLASSIFICATION[b] DATA ENTRY FORM

AIR PROGRAM / POLLUTANT	SIP	PSD	NSPS (Part 60)	NESHAP (Part 61)	MACT (Part 63)	TITLE V	AREA CLASSIFICATION A – Attainment U – Unclassifiable N – Nonattainment
SO_2	B						U
NO_X	B						U
CO	B						U
PM_{10}	B						U
PT (Particulate)	B						
VOC	B						U
THAP (Total HAPs)	B						
			APPLICABLE SUBPART				

[a] Aerometric Information Retrieval System (AIRS) Facility Subsystem (AFS)

[b] AIRS/AFS Classification Codes:

A = Actual or potential emissions of a pollutant are above the applicable major source threshold. For NESHAP only, class "A" is applied to each pollutant which is below the 10 T/yr threshold, but which contributes to a plant total in excess of 25 T/yr of all NESHAP pollutants.

SM = Potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable regulations or limitations.

B = Actual and potential emissions below all applicable major source thresholds.

C = Class is unknown.

ND = Major source thresholds are not defined (e.g., radionuclides).

Appendix C
EI Calculation

Permit to Construct No. P-040106

Merritt Brothers Lumber Co., Athol

Facility ID No. 055-00039

4. POTENTIAL TO EMIT, ESTIMATED EMISSIONS, LIMITATIONS ON POTENTIAL TO EMIT

POTENTIAL TO EMIT

Potential to Emit is defined by IDAPA 58-01-01-006-73:

"Potential to Emit/Potential Emissions. The maximum capacity of a facility to emit an air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the facility to emit an air pollutant, provided the limitation or its effect on emissions is state or federally enforceable, shall be treated as part of its design. Limitations may include, but are not limited to, air pollution control equipment, restrictions on hours of operation, and restrictions on the type and amount of material combusted, stored or processed."

Status: The potential to emit has been determined for the facility. The uncontrolled potential emissions for all pollutants are less than 100 tpy. Therefore the sources is a minor source.

EMISSION ESTIMATES

According to the guidance document, emission estimates must be documented using one of three methodologies. These methodologies are: standard engineering and scientific principles and practices, published emission factors, and source tests conducted on similar type emission units.

Methodology Used: All of the emissions estimates have been made using standard engineering and scientific principles and practices and published emission factors. Emissions estimation calculations are demonstrated and the sources of the emission factors are identified in Appendix A.

EMISSION ESTIMATE CALCULATIONS

Emission estimate calculations are included for the proposed equipment. The new kiln will be part of a single emissions unit called 'kilns.' Production from the individual kilns is not tracked separately. Potential to emit calculations are shown for all the kilns operating at maximum production.

Dry Kiln Emission Calculations

Dry kiln VOC emissions are estimated based on the Idaho DEQ emission factor for dry kiln VOCs. Current drying capacity at the Athol facility is 90 million board feet per year, commonly written as 90,000 thousand board feet per year (mbdft/yr). With the addition of the fourth kiln, drying capacity will increase by 40,000 mbdft/yr to 130,000 mbdft/yr.

The Idaho VOC emission factor of 1.5 lb/mbdft has been used for the VOC emission estimates because it is the most conservative emission factor found and covers all wood species that could potentially be processed. A copy of the Idaho DEQ wood product emission factors is included at the back of Appendix A. The other VOC emission factor references in Appendix A include VOC emission factors that range from 1.38 lb/mbdft for ponderosa pine down to 0.12 lb/mbdft for hemlock. The Idaho VOC factor provides a conservative estimate of PTE for VOCs.

Maximum potential dry kiln VOC emissions are calculated as follows:

Emission Factor:	1.5 lb/mbdft (Idaho DEQ Factor)
Emission Calculation:	1.5 lb/mbdft * 130,000 mbdft/yr * 1 ton/2000 lb = 97.5 tpy

Particulate matter and PM_{10} emissions from the dry kilns have been estimated using emission factors published by the Olympic Region Clean Air Agency (ORCAA), formally the Olympic Air Pollution Control Authority (OAPCA). These factors were chosen over the Idaho DEQ PM and PM_{10} emission factors because they are better supported with test data and analysis. A copy of the OAPCA emission factors is included at the back of Appendix A. The emission factor for PM and PM_{10} is 0.11 lb/mbdft.

Maximum potential dry kiln PM_{10} emissions are calculated as follows:

Emission Factor:	0.11 lb/mbdft (ORCAA/OAPCA Emission Factor)
Emission Calculation:	0.11 lb/mbdft * 130,000 mbdft/yr * 1 ton/2000 lb = 7.15 tpy

Dry kiln emission factors have been identified for three HAPs; formaldehyde, methanol and phenol. OAPCA has published dry kiln emission factors for PM, VOC, pinenes and phenol from drying Douglas fir, hemlock and Alder. The OAPCA dry kiln factors do not include any pine species. Oregon State University (OSU) performed a small-scale kiln study for the Idaho Forest Association. The OSU study produced emission factors for VOCs, methanol and formaldehyde and included white fir, douglas fir, lodgepole pine and ponderosa pine. Copies of the emission factor summaries from both sources are included in Appendix A.

Of the four species in the OSU study, lodgepole pine showed the highest formaldehyde emission rate of 0.0040 lb/mbdft, so lodgepole was chosen as the representative species for formaldehyde and methanol emissions estimates. In the ORCAA/OAPCA dry kiln factors, the highest phenol emission factor was from Douglas fir with an emission rate of 0.004 lb/mbdft.

HAPs emissions calculations for the dry kilns are as follows:

Formaldehyde Emission Factor:	0.004 lb/mbdft (OSU Emission Factor)
Emission Calculation:	0.004 lb/mbdft * 130,000 mbdft/yr * 1 ton/2000 lb = 0.26 tpy
Methanol Emission Factor:	0.060 lb/mbdft (OSU Emission Factor)
Emission Calculation:	0.060 lb/mbdft * 130,000 mbdft/yr * 1 ton/2000 lb = 3.90 tpy
Phenol Emission Factor:	0.004 lb/mbdft (ORCAA/OAPCA Emission Factor)
Emission Calculation:	0.004 lb/mbdft * 130,000 mbdft/yr * 1 ton/2000 lb = 0.26 tpy

Boiler Emission Calculations

Boiler emissions have been estimated using EPA's AP-42 emission factors for natural gas combustion in external combustion sources, Section 1.4. The emission factor tables from AP-42 are presented in Appendix A. The boilers are permitted for operation all year. Boiler emissions have been calculated based on 8,760 hours per year to provide a worst-case estimate of emissions. Emission factors are expressed in units of pounds per million standard cubic feet of gas burned ($lb/10^6$ scf). The existing boiler (Boiler 1) and the proposed boiler (Boiler 2) each have the capacity to burn up to 29,291 cubic feet of natural gas per your (scf/hr).

PM_{10} Emissions, one boiler: PM_{10} emission factor, 7.6 lb/10^6 scf (AP-42, Table 1.4-2)
7.6 lb/10^6 scf * 29,291 scf/hr * 8,760 hr/yr / 2000 lb/ton = 0.98 tpy

SO_2 Emissions, one boiler: SO_2 emission factor, 0.6 lb/10^6 scf (AP-42, Table 1.4-2)
0.6 lb/10^6 scf * 29,291 scf/hr * 8,760 hr/yr / 2000 lb/ton = 0.08 tpy

VOC Emissions, one boiler: VOC emission factor, 5.5 lb/10^6 scf (AP-42, Table 1.4-2)
5.5 lb/10^6 scf * 29,291 scf/hr * 8,760 hr/yr / 2000 lb/ton = 0.71 tpy

NO_x Emissions, one boiler: NO_x emission factor, 100 lb/10^6 scf (AP-42, Table 1.4-1)
100 lb/10^6 scf * 29,291 scf/hr * 8,760 hr/yr / 2000 lb/ton = 12.83 tpy

CO Emissions, one boiler: CO emission factor, 84 lb/10^6 scf (AP-42, Table 1.4-1)
84 lb/10^6 scf * 29,291 scf/hr * 8,760 hr/yr / 2000 lb/ton = 10.78 tpy

Lead (Pb) Emissions, one boiler: Pb emission factor, 5.00E-04 lb/10^6 scf (AP-42, Table 1.4-2)
5.00E-04 lb/10^6 scf * 29,291 scf/hr * 8,760 hr/yr / 2000 lb/ton = 6.41E-05 tpy

AP-42 provides emission factors for a number of organic and metal HAPs. All the HAPs are listed in Appendix A. The following calculation is a typical HAP calculation, using benzene. All the other HAP calculations are performed in the same way.

Benzene Emissions, one boiler: benzene e.f., 2.1E-03 lb/10^6 scf (AP-42, Table 1.4-3)
2.1E-03 lb/10^6 lb/10^6 scf * 29,291 scf/hr * 8,760 hr/yr / 2000 lb/ton = 0.135 tpy

LIMITATIONS ON POTENTIAL TO EMIT

Status: Merritt Brothers is not proposing limits on Potential to Emit. The facility is a "True Minor" source and will remain a "True Minor" source after the modifications. The uncontrolled Potential to Emit for all pollutants is less than 100 tpy.